CLINICAL RESEARCH STUDIES

From the Eastern Vascular Society

Regeneration

Bruce J. Brener, MD, *Newark, NJ*

"You don't need a weatherman
to know which way the wind blows"

Bob Dylan
Subterranean Homesick Blues

It is a great honor to be the 16th president of the nation's largest regional vascular society and follow in the footsteps of some of our most illustrious leaders. It is particularly meaningful to return to Boston, the site of my formal training in medicine, the birthplace of my three children, and the origins of my interest in vascular surgery.

Vascular Surgery is a "calling."[1] We are attracted by the esthetic beauty, the precise techniques, and the reconstructive nature of the specialty. We acknowledge that we have some personality characteristics (some say defects) that attract us to a highly risky, highly demanding, intense, often frustrating, but highly rewarding career. Finally, we are often drawn by our relationships with mentors. I will bet that many of you were attracted to vascular surgery by your respect for and admiration of a teacher. I know I was. I believe that vascular surgery is learned and passed on in an apprenticeship, often at the elbow of a member of an older generation.

In this address I would first like to pay my respects to my mentors, some of whom have recently passed away; second to briefly describe a path of personal renewal; and finally to reflect on the changes occurring in our profession as well as our specialty, which force us to retrain and which place new responsibilities upon us to prepare the next generation of vascular surgeons.

REGENERATION

The title of this talk is borrowed from Pat Barker, an English writer, who has produced three novels entitled the Regeneration Trilogy. In the first historic novel,[2] Sigfried Sassoon, poet, officer, and highly decorated war hero, protests publicly against the senseless slaughter of soldiers of both sides toward the end of World War I. He refuses to fight. Rather than being tried for treason, he is declared mentally unsound after a well-connected friend, officer, and writer influences the war council. A psychiatrist "cures" him of his ailment and sends him back to the front to fight again.

I am not so much interested in Ms Barker's ironic use of the term "regeneration"—in this case referring to a cure in which the soldier is allegedly "restored" to health and sent back to the killing fields, a theme brilliantly portrayed in the novel Catch 22. Rather I am interested in two other meanings, first a focus on "generation," more specifically, the relationship between the generations. In this novel, Sassoon, the so-called impaired officer, is most concerned with the senseless slaughter of his young protégés, the infantrymen, for whose safety he is responsible, a theme resonating in vascular surgery. And second, a focus on personal regeneration, that is spiritual renewal and growth that comes from change. Again, in this historic novel, the world is going through cataclysmic geopolitical changes and the leadership is responding by using the old paradigms. Sassoon sees clearly that in times of change, the old ways are not adequate, a theme easily applicable to our current status.

For wisdom and inspiration I have called upon the teachings of an aging troubadour, Robert Allen Zimmerman, a man who is continuously reinventing himself. Born in Duluth, Minn, on May 24, 1941 (a few months after me), he celebrated his 60th birthday. You may know him as Bob Dylan, an amazingly productive man who has recorded 453 songs on 42 albums[3] and continues to perform 100 shows a year. I am not suggesting that we use all of his sources of mind enhancement. However, as I hope you will see, his poetry may give us guidance.

THREE GENERATIONS OF VASCULAR SURGEONS

Like many of you, I am a part of the third generation of vascular surgeons that have trained or lived in Boston.

From the Department of Surgery, Division of Vascular Surgery, Newark Beth Israel Medical Center.
Competition of interest: nil.
Presented at the Sixteenth Annual Meeting of the Eastern Vascular Society, Boston, Mass, May 2-5, 2002.
Reprint requests: Bruce J. Brener, MD, Newark Beth Israel Medical Center, 201 Lyons Ave, Newark, NJ 07112.
J Vasc Surg 2002;36:1097-1103.

0741-5214/2002/$35.00 + 0 **24/6/129640**
doi:10.1067/mva.2002.129640

Fig 1. Robert E. Gross.

Fig 2. Robert R. Linton.

The first generation grew out of the tradition of the multifaceted general surgeon. Robert Gross (Fig 1) was a Brigham surgical resident under Elliot Cutler, the Moseley Professor and immediate successor to Harvey Cushing. After practicing ligation of the ductus arteriosus in cadavers and at the animal laboratory, Dr Gross, then the chief resident at Children's Hospital, successfully ligated the first patent ductus in a 7-year-old girl on August 26, 1938. This courageous act helped open the door to our specialty.

I have many memories of Dr Gross, but one will always stand out. A traditional event during my surgical training was the performance of a ligation of a patent ductus with the master as first assistant! In my case, this occurred in 1967 shortly after the end of my internship. By 1967, Dr Gross had performed over a thousand ductus repairs. I had never seen a thoracotomy. I can still remember the trepidation while removing those thin vascular clamps and praying that my first vascular anastomosis did not leak.

Robert Linton (Fig 2) applied Gross' principles and expanded the field beyond sympathectomy, vein surgery, and amputation. Dr Bruce Cutler in his Presidential Address before the New England Vascular Society has documented his many contributions.[4] Dr Linton's legacy was his insistence upon technical perfection, or as he put it "Do it right."

Richard Warren (Fig 3) was another member of the first generation that influenced me personally. He passed away last year. He was a proper Bostonian with a prominent family history, influential before the Revolutionary War. Warrens were instrumental in the early development of both Harvard Medical School and the Massachusetts General Hospital.[5] I remember his energy, ingenuity, wide-ranging interests, and courageous willingness to try new techniques. I am particularly grateful for his invitation to work in his research laboratory during a summer in medical school; his encouragement to consider vascular surgery, to write and to experiment; and his personal attention to my wife and me.

The second generation of vascular surgeons in Boston firmly established vascular surgery as a specialty. Four surgeons from the Brigham program passed away recently. Two mentors were general surgeons, Dr Francis Moore and Dr John Brooks, and two were vascular surgeons, Dr Edward Edwards and Dr Chilton Crane. They were wonderful teachers who treated the residents like family. Dr Moore was a towering figure who had an enormous impact on surgery. When he died last year, Dr Joseph Murray, a close colleague and Nobel laureate wrote "the sturdiest oak in American surgery has fallen; our trustiest compass has been lost."[6]

Finally, I wish to thank Dr R. Clement Darling II (Fig 4) for his inspiration and support. He was born August 28, 1927, the second of five children, in Richmond, Calif, but grew up in Taunton, Mass. His father was the caretaker of a farm owned by a professor at Harvard Medical School. Clem joined the Marines at age 17 years and fought at

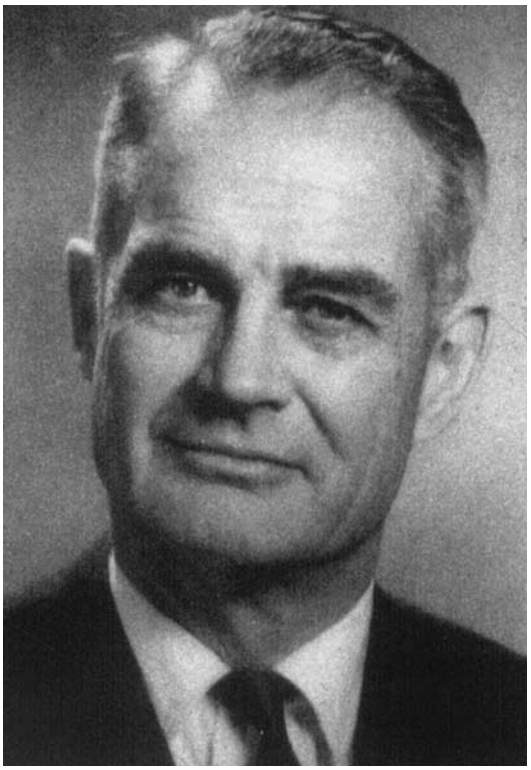

Fig 3. Richard Warren.

Fig 4. R. Clement Darling II.

Guadalcanal. After his tour of duty, he attended Boston University as both an undergraduate and as a medical student. He was the medical class valedictorian and was accepted by the Massachusetts General Hospital as the first "non–Ivy League" surgical resident (his description). During this period, he studied under Dr Gross, an experience undoubtedly sparking his interest in blood vessels. After his residency, he went to Houston to work with Dr Michael DeBakey. Among his colleagues were Drs Blaisdell, Cooley, Garrett, and one of his closest friends, Stanley Crawford, who had been a few years his senior at the MGH.

Dr Robert Linton hired Dr Darling in 1961, beginning a decade-long challenging but fruitful relationship. Dr Darling emphasized the primary importance of technical excellence; kept meticulous records, reporting his findings with life-table techniques; established the superiority of autogenous grafts in the leg; introduced and popularized the use of the Pulse Volume Recorder and other noninvasive tests; tested and reported on the use of autotransfusion; and performed diagnostic angiography.

But according to Dr Darling, his greatest legacy was his fellows, the third generation. Here is a quick personal story. In December 1971, at the end of my general surgical residency, the Army offered me a 6-month reprieve after which I was scheduled to report to Vietnam. I asked Dr Darling if I could work with him for 6 months. Because he had no fellowship, there was no salary line. I had two children, but I was willing to work without pay. Clem accepted me as his first fellow and generously arranged a salary through Dr Gerald Austen. I stayed for 18 months until July 1973, an experience that radically changed my life and influenced me deeply. Dr Darling trained many surgeons in this Society. According to his son, Clem kept a close but discreet eye on the fellows after they left, often referring to their achievements in a fatherly way.

I cannot tell you how grateful I am to Dr Darling. The best way I can repay him is to pass on his teachings: the wisdom and experience he had gained from Drs Gross, deBakey, Cooley, Crawford, Linton, and others and his thoughts and techniques.

INTERGENERATIONAL LEARNING

We Baby Boomers must learn from our younger colleagues. The orthodox method of teaching emphasizes the passage of information, mores, and traditions of the past to younger protégés. Recently, it has been emphasized that the "unidirectional flow from [older to younger] ignores the power of reciprocal relationships."[7] This notion of intergenerational learning is not new. As he states in his memoirs,[8] Robert Gross developed "the habit of listening to younger men." He was referring to his assistant resident Charles Hufnagel who demonstrated the safety of abdominal aortic resection in the laboratory by using hypothermia, thus preventing the paraplegia that had plagued Dr Gross's attempts to treat experimental aortic coarctation. And John Ricotta recently touched on this paradigm in his

presidential address to the Society for Clinical Vascular Surgery, entitled "On old dogs and new tricks."[9]

It became clear to me in the early 1990s that vascular surgery was going through a sea change, that many of our procedures would be eliminated and modified by catheter-based technology. In 1995, I asked Kim Hodgson for some help in relearning these catheter-based skills. This required a year of planning, which included my obtaining a temporary medical license from Illinois, applying to his hospital for privileges, and spending some time away from my practice and family. On Kim's part, it required organizing his practice so that we could concentrate on a large volume of patients in a short period of time, asking his partners and fellows to allow a stranger to come and work, convincing the CEO of his hospital that this was a good idea, and his patiently instructing an old dog. While this was clearly only a beginning of my "reeducation," I was able to bring home new ideas.

Soon after this, I became increasingly frustrated that I had not learned aortic stent grafting techniques. In the spring of 1998, I asked an old friend and (younger) colleague Michael Marin for help. During the next year, I spent a lot of time traveling to Mount Sinai, watching and learning. Mike was willing to tutor me in New Jersey, an incredible gift, because again it required commitment, patience, and unselfish consumption of time, our most precious asset.

I am grateful to these younger surgeons who helped me add a new dimension to my practice. For many vascular surgeons in their 50s and early 60s the current climate in medicine is taking a toll. It has been said that the average age of retirement of surgeons is 62 years. In my opinion, this is a terrible waste of talent and experience. Many of us need change rather than retirement. Learning new skills and passing them to the fellows has helped me recapture the excitement of vascular surgery, beginning a process of personal regeneration.

STAYED IN MISSISSIPPI A DAY TOO LONG

Many of you may think that catheter-based therapy will not attain the status of conventional open vascular procedures. I do not agree.

Dr Frank Veith, a third generation surgeon trained in Boston, reiterated in his presidential address before the Society for Vascular Surgery his prediction that 40% to 70% of vascular procedures will be catheter-based.[10] That moment is almost here. The major hurdle will be the treatment of carotid disease. The CREST study may be the defining moment in the vascular surgery of the decade. I believe like most of you that carotid endarterectomy is one of the safest, most effective, reliable, efficient, inexpensive and enduring operations in all fields of surgery. I will miss it. I say "miss it" intentionally because I believe that even if carotid endarterectomy is more effective and safer than stenting, the supremacy of the operative procedure will be eroded by catheter-based techniques. Over the next several years, company-sponsored studies will show that results of carotid stenting are improving. Patients are moved by technology and will exchange less than perfect results for less invasive techniques. If the CREST study shows equivalence, vascular surgeons will retrain or regret it.

Dylan's songs often express regret, his response to aging, mistakes, and lost loves. In a song written several years ago, entitled "Mississippi,"[11] he explores these themes:

Every step of the way we walk the line
Your days are numbered, so are mine
Time is pillin' up, we struggle and we scrape
We're all boxed in, nowhere to escape. . .

At the end of the song he delivers a cold admonition:

Well, the emptiness is endless, cold as the clay
You can always come back, but you can't come all the way
Only one thing I did wrong
Stayed in Mississippi a day too long.

I recommend to those of you who are procrastinating, who are finding it difficult to obtain interventional skills, to make the investment. If you ignore these trends, you will regret it. You might come back, but you will not come back all the way. Right now you are in Mississippi. Do not stay in Mississippi a day too long.

THE FOURTH GENERATION: THE CHALLENGE TO ORGANIZED VASCULAR SURGERY

Now I would like to focus on the next generation.

We, the Baby Boomers, are the stewards of the next generation of vascular surgeons.

We must recognize the differences between our generations. First, more women are enrolled in medical school. In the 1960s and 1970s, only 5% to 10% of students were women; in 2001, more than 45% were female.[11] What specialties attract women? Vascular surgery is not one of them. In 1999 to 2000, women comprised over two thirds of the obstetrics/gynecology and pediatric residents but only 21.3% and 13.8% of general surgery and vascular surgery residents.[12]

Second, the cost of obtaining a medical education has escalated. In the 1960s and 1970s, the median tuition and fees in a private medical school were $1000 to $2000 per year. In 2000, the median was $30,000. The most expensive private schools cost up to $37,000.[12] The total cost for 4 years of medical school can be as high as $200,000.

Third, as a result of these enormous costs, many students are deeply in debt as they enter residencies. The mean debt has increased from $46,200 in 1990 to $94,901 in 2000. More than half the students owe more than $75,000.[11] Debts of $100,000 to $200,000 are common. As one medical student recently stated "Thomas Jefferson incurred less debt when he purchased the Louisiana Territory from the French back in 1803."[13]

In most loan programs, such as the Stafford Loan, the payment of interest can be deferred during training. Interest still accrues during the student or resident years. It then

is capitalized (ie, added to the total). For a $100,000 loan, the debt might be $130,000.

Fourth, medical students are older than their predecessors. Some delay entry into medical school. Others prepare for different careers and then pursue medicine. Thus, many enter medicine in their late 20s to early 30s.

Today's students are often women, are more likely to be in minority or underrepresented population groups, are older, may have had other jobs, are often married, and are likely to be deeply in debt. Whether you call them the MTV generation or generation X, they are not Baby Boomers. They are more independent, less responsive to authority, and more interested in finding a balance between work and what they consider to be their "real" life. These students are very well informed through personal networking and the Internet. They are the ultimate informed consumers.

And many of them are shunning surgery. We think that performing vascular surgery is a privilege, a challenge, a noble endeavor, and a calling. Most of our students are not interested. We are familiar with the increasing numbers of unfilled positions in the general surgical match and the decreasing number of applicants to vascular programs. Why is this happening?

First, students seem to be seeking a more controllable lifestyle. I am not sure I blame them. Baby Boomer surgeons have worked very hard. We developed our skills in long arduous training programs, often "taking call" every other night for years. Our residencies were somewhat militaristic, based on "chain of command" and clear definitions of authority, with almost religious respect for our elders, even if they were only 1 or 2 years above us. Fatigue was a sign of weakness. We had the camaraderie of "The Band of Brothers." As a result, those who survived were highly trained, competent, well-rounded surgeons who were comfortable operating in all areas of the body.

To many of us, today's students seem lazy and unmotivated. They are not. They are different. Dr Rod Rohrich has described his ambivalence in his paper entitled "Training the generation X plastic surgeon: Dispelling the myths."[14] Among the characteristics of this generation he cites the following: self-absorbed, independent, slow to commit to relationships, creative, flexible, willing to take several jobs, seasoned consumers, reality-driven. Is it any surprise that this generation of older, more culturally diverse, lifestyle-oriented consumers with large debts want more control of their time?

Second, students see surgery changing. They see an intrusion of other specialists inserting themselves into roles traditionally reserved for surgeons. This is true in general surgery (interventional radiologists, gastroenterologists, oncologists). It is especially true in vascular surgery (interventional radiologists, vascular medicine specialists, cardiologists). Students are concerned about the future role of surgeons.

Third, attending surgeons are unhappy and vocal. It is impossible to go into the surgical locker room, physicians' lounge, lunchrooms, etc, without hearing surgeons of my generation complaining.

Fourth, the income of general and vascular surgeons is declining because reimbursements are plummeting and expenses are soaring. Over the last 5 years, the reimbursement from Medicare for our three index procedures (aortic aneurysm resection, carotid endarterectomy, and femoropopliteal bypass) has fallen 25%. If the cost of living is increasing at 3% per year, we have sustained a loss of 40%. On the basis of flawed reasoning, the planned Medicare cuts will result in additional 17% reductions between 2002 and 2005. In my practice during the same time period that reimbursements have fallen, the office expense for each full time equivalent surgeon has increased 28%.

Physicians have already begun to shun patients on Medicare.[15] As Paul Krugman pointed out in a recent opinion-editorial piece in the New York Times,[16] "Medicare payments have already been squeezed beyond their limits, to the point where recipients can't find doctors willing to take them. Something will have to give, and soon."

Much to my surprise, students and residents know the numbers.

Furthermore, a malpractice crisis is well underway. In New Jersey, physicians and hospitals report significant increases in premiums and inability to obtain coverage. Physicians are moving out of state or leaving practice.[17] Certainly, we want to reduce medical errors and compensate patients adequately when they have been injured through negligence. However, despite the implications of the report of the Institute of Medicine and the contentions of trial lawyers, the increase in premiums is not due to increased physician negligence. The reasons for the increased premium rates have been amply documented: high awards, decreased returns on investments of reserves, and the poor business practices of insurers.

The premium costs vary widely among the states. As has been pointed out, it is highly unlikely that surgery is performed more safely in California where the insurance rates have remained manageable due to tort reform than in Florida, Pennsylvania, New Jersey, or Mississippi where the premium rates have soared.[18]

CARING FOR THE NEXT GENERATION

There are no easy solutions for these deep-seated societal issues. Clearly the efforts of those leaders who wish to shorten the general surgery residency program by a year and take more control over the training, testing, and certifying of vascular surgeons are to be commended. These are suggestions that will incrementally benefit the next generation of surgeons and ultimately the public. However, there are other challenging issues that demand imaginative and dedicated responses.

First, we need to respond to the changes in the demographics and attitudes of the students. We need to devise flexible training programs so that 30-year-old to 35-year-old women who want to have families will choose vascular surgery. Admittedly, it will be difficult to convince program directors to allow residents to take off 3 months for family leave and then fit back into a program. It can be done, but

this will require close cooperation between general and vascular program directors. In addition, we need to provide childcare facilities at our hospitals.

Second, we will have to find imaginative ways to help students and residents achieve debt reduction, deferment, or forgiveness. Students and residents are very concerned about this issue. We are not likely to be able to effect changes in the cost of medical education. So, we are left with debt management. It is unlikely that we can count on governments, hospitals, or insurance companies to provide debt relief for surgical residents and fellows. Would surgical specialty societies, the American College of Surgeons, and industry participate in a cooperative venture to develop debt reduction programs? I am not optimistic about this proposal.

Third, we will have to provide advanced interventional training for our fellows. It is not enough to be able to perform diagnostic angiography, iliac angioplasty, and stent graft placement. As I mentioned, we will need to include the techniques of carotid stenting. Dylan reminds us:

The walls of pride are high and wide
Can't see over to the other side. . .[19]

On the "other side" is the patient asking for catheter-based therapy. However, attaining the skills necessary to perform carotid angioplasty will not only require advanced training, it will require resolving the ethical dilemma felt by many surgeons about the relative value of the two procedures.

Fourth, and most important, we need to restore control over reimbursements and malpractice premiums. We seek to attract students to a challenging field with a long, arduous training program, elderly and frail patients, and complex procedures with little room for error. At the same time, income is falling, practice costs are increasing, and surgeons are at high risk for litigation.

Addressing these issues of reimbursement and tort reform will require political and financial commitment as well as cooperation with other stakeholders. At the request of the Board of Governors, the Regents of The American College of Surgeons have finally established a tax-exempt entity, which will allow expansion of the College's legislative efforts and establishment of a Political Action Committee. The American Medical Association has committed its considerable resources to help national and state organizations address liability tort reform. Organized vascular surgery must have a voice in these and other political initiatives. Regional vascular societies must encourage the national vascular organizations to establish a PAC and work closely with other larger organizations even if they have not been particularly friendly to us in the past.

I would like to end with a poem written by Eamon Grennan and recently published in The New Yorker.[20]

Breath

Glassed in all day like this, I keep toweling the windows dry,
Trying to wipe the fog away that keeps me blind behind glass,
Unable to see the world outside for what it is, the way things
Become shadows and blunted silhouettes of themselves, birds
Only blurs where they shake a branch when they land or leave
Or just dash past, a flash of cloud particles snatching at crumbs
As I do myself each time I get the big window clear again and try
To take in all the colors and shapes out there, all the living bits
Of matter that stand in their own ordinary uncanny light,
Until blearing begins again and I see my own breathing does it.

Let's not let our own breath obscure the view of the world beyond the glass. We must focus on the social and economic issues that are fundamental to physician satisfaction and not let our energies be sapped by attention to parochial interests. We must answer the needs of the next generation by finding the means to restore autonomy, control, and sanity to the economics of medicine.

Finally, let us remain proud of our achievements. While we recognize the shortcomings of our profession and rail against unconscionable treatment by politicians, businessmen, and insurers, we must share with our young colleagues the feelings of joy, exhilaration, and deep commitment we experience daily. We must remind ourselves that this is no ordinary business. Medicine is a "calling." The next generation must be prepared as we are to commit to a sacred and binding covenant with society.[21] We will care for the old, the poor, the sick, and the vulnerable. Society will reward us with trust and respect. Our commitment to this ancient covenant is always the first step towards regeneration.

Again, I would like to thank you for the honor of being your President. Let's let Mr Dylan have the last word:

Come gather 'round people
Wherever you roam
And admit that the waters
Around you have grown
And accept it that soon
You'll be drenched to the bone.
If your time to you
Is worth savin'
Then you better start swimmin'
Or you'll sink like a stone
For the times they are a-changin'.[22]

REFERENCES

1. Callings LG. Finding and following an authentic life. New York: Three Rivers Press; 1997.
2. Barker P. Regeneration. New York: Penguin Books; 1991.
3. Gunderson E. Times change, but Dylan leaves a lasting imprint. USA Today; 18 May 2001.
4. Cutler BS. Robert R. Lindon, MD: a legacy of "doing it right.". J Vasc Surg 1994;19:951-63.
5. Truax R. The Doctors Warren of Boston. Boston: Houghton Mifflin Company; 1968.
6. Murray J. In memoriam. Francis D. Moore, 1913-2001. Harvard Medical School Alumni Bulletin 2001;75:59.
7. Gadsden VL, Hall M. National Center on Fathers and Families: intergenerational learning: a review of the literature. Available from: URL: http://fatherfamilylink.gse.upenn,edu/org/ncoff/litrev/iglr.htm
8. Moore FD, Folkman J. Biographical memoirs: Robert Edward Gross. Available from: URL:http://books.nap.edu/html/biomems/rgross.html
9. Ricotta J. Presidential address: on old dogs and new tricks. J Vasc Surg 2002;36:657-62.
10. Veith FJ. Presidential address: Charles Darwin and vascular surgery. J Vasc Surg 1997;25:8-18.
11. Dylan R. Mississippi. Love and Theft, 2001, Special Rider Music.
12. Association of American Medical Colleges: AAMC data book: statistical information related to medical schools and teaching hospitals. Washington (DC): AAMC; 2001.
13. Joyce D. Becoming a Jedi isn't easy. Harvard Medical School Alumni Bulletin 2001;75:26-7.
14. Rohrich RJ. Training the generation X plastic surgeon: dispelling the myths. Plast Reconstr Surg 2001;108:1733-4.
15. Pear R. Doctors shunning patients with Medicare. New York Times; 17 Mar 2002.
16. Krugman P. Bad medicine. New York Times; 19 Mar 2002.
17. Campbell CA. Jersey physicians run for coverage: malpractice insurers vanishing. The Star-Ledger; 18 Feb 2002.
18. Trends in 2001 rates for physicians' medical professional liability insurance: carrier survey results. Medical Liability Monitor 2001;26.
19. Dylan R. Cold Irons Bound, Time Out of Mind, 1997, Special Rider Music.
20. Grennan E. Breath. The New Yorker; 2001.
21. Munson J. Renewing an ancient covenant. Harvard Medical Alumni Bulletin 2001;75:24-25.
22. Dylan R. The Times They Are A-changin', 1964, Special Rider Music.

Submitted Jul 19, 2002; accepted Jul 25, 2002.

The JVS Ombudsman

The ombudsman's role is to act as an advocate for authors and represent their position to the editorial staff in relation to the process of manuscript submission, review, and publication. The ombudsman is *not* responsible for evaluating the content of a manuscript or determining whether the editors made the correct decision with regard to acceptance or rejection of the paper. If an author or other person has an unresolved complaint or question about the editorial process of the Journal, he or she should contact Dr James S. T. Yao (Northwestern University Medical School, Department of Surgery, 201 E. Huron Street, Suite 10-105, Chicago, IL 60611), who will review the matter.